DOCUMENT RESUME

ED 096 341 95 TM 003 947

AUTHOR	Levinthal, Charles F.
TITLE	An Analysis of the Teacher Evaluation Process. Final Report.
SPONS AGENCY	National Inst. of Education (DHEW), Washington, D.C.
BUREAU NO	BR-2-B-089-P
PUB DATE	15 May 74
GRANT	OEG-2-2-2B089
NOTE	80p.
EDRS PRICE	MF-$0.75 HC-$4.20 PLUS POSTAGE
DESCRIPTORS	Analysis of Variance; *Behavior Rating Scales; Evaluation Techniques; Student Evaluation; *Teacher Behavior; *Teacher Evaluation; Teacher Rating; *Validity
IDENTIFIERS	*Discrepancy Analysis

ABSTRACT

In a single questionnaire, students reported their ideal frequency of occurrence (I-scores) for common teaching behaviors, the observed frequency of occurrence (O-scores), their evaluation of an "outstanding" to "poor" scale for each behavior expressed as a teaching attribute (E-score), and their overall evaluation of the instructor. A discrepancy score (D-score) was computed for each student as the absolute difference between the I-score and O-score for each behavior. The data showed that I-score responses were variable among student respondents, but that the distribution of I-scores did not substantially vary with respect to either course content, course level, sex of student, anticipated grade, or overall evaluation of the teacher. The discrepancy hypothesis would predict significant D-score vs. E-score correlations in the overall population and also for each I-score subpopulation (defined by their I-score response toward a given behavior). Correlations were significant for only those having an I-score at an extreme end of the frequency scale, suggesting that a strict discrepancy process is not being used by all student raters. Alternative hypotheses are discussed. (Author)

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Final Report

Project No. 2B089
Grant No. OEG-2-2-2B089

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AN ANALYSIS OF THE TEACHER EVALUATION PROCESS

May 15, 1974

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
National Institutes of Education
Washington, D. C. 20208

Abstract

One conception of teacher evaluation treats an evaluative judgment (E) as a result of estimating the discrepancy between the instructor's observed frequency of behavior (O) and the ideal frequency (I). In a single questionnaire, students reported their ideal frequency of occurrence (I-scores) for common teaching behaviors, the observed frequency of occurrence (O-scores), their evaluation on an "outstanding" to "poor" scale for each behavior expressed as a teaching attribute (E-score), and their overall evaluation of the instructor. A discrepancy score (D-score) was computed for each student as the absolute difference between the I-score and O-score for each behavior.

The data showed that I-score responses were variable among student respondents, but that the distribution of I-scores did not substantially vary with respect to either course content, course level, sex of student, anticipated grade or overall evaluation of the teacher.

The discrepancy hypothesis would predict significant D-score vs. E-score correlations in the overall population and also for each I-score subpopulation (defined by their I-score response toward a given behavior). Correlations were significant for only those having an I-score at an extreme end of the frequency scale, suggesting that a strict discrepancy process is not being used by all student raters. Alternative hypotheses are discussed.

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An analysis of the teacher evaluation process

Charles F. Levinthal

Hofstra University

Hempstead, New York

May 15, 1974

The research reported herein was performed pursuant to a grant with the National Institutes of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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Final Report

A. Overall objective: The fundamental question of this project has been the validity and usefulness of the idea that teacher evaluation is the estimate of discrepancy between ideal behavior and real (observed) behavior in an educational setting, and that teacher evaluation procedures should incorporate such a discrepancy analysis.

B. Terminology: Although a more detailed discussion is found in the Proposal (Pp. 12-14), a brief description of the variables studied in this project follows, for the convenience of the reader.

1) I-scores. For each teaching behavior, what frequency ("almost always," "often," "occasionally," "seldom," "almost never") of occurrence does the evaluator (student) prefer?

2) O-scores. For each teaching behavior, what frequency ("almost always," "often," etc.) of occurrence has the evaluator (student) observed?

3) E-scores. For each teaching attribute, what evaluative assessment ("Outstanding," "good," "adequate," "fair," "poor") would fit the teacher?

4) D-scores. The computed absolute difference between the I-score and the O-score for each behavior.

5) S-scores. For each teaching attribute, how important (salient) would an evaluation on that attribute be on an overall evaluation of the teacher ("Of next to no importance," "Not very important," "Of only moderate importance," "Important," "Extremely important").

6) Et-scores. What overall assessment of teaching effectiveness could be made ("outstanding," "good," etc.) of the teacher.

C. Some Core Questions: Although the outcome of the project will be presented in roughly chronological form, there is a cluster of fundamental issues that will be analyzed in more than one of the studies. They are presented here and will be discussed later as a whole in the Conclusions section.

1) What are the characteristics of I-scores? Are they variable (i.e., do they reveal a lack of unanimity re-

garding ideal?) and, if they are, is the distribution of I-scores in a student sample stable over time, over differences in subject matter, subject level, and student characteristics?

2) Are individual item responses related to an estimation of overall teaching ability? Specifically are I-scores, O-scores, E-scores and D-scores correlated to E_T-scores? Are they independent?

3) How is the D-score related to the E-score? Is the D *vs.* E association closer than when one relates the more traditional O-score with the E-score?

4) Does a computed aggregate of E-scores (such as an arithmetic mean) or a similarly computed aggregate of D-scores approximate the E_T-score better than a single item? Does it help to weigh each item response by the appropriate S-score?

D. Procedure and results of a preliminary study (code: OEA):

1) Rationale: The intention of this preliminary study was to test out a collection of 30 teaching behaviors (see Appendix B) for clarity and reasonableness, and to obtain a collection of I-scores.

2) Sample characteristics: The student sample consisted of 47 Hofstra University undergraduate biology-major seniors reacting in one classroom to a single instructor. The course involved was of a combination of advanced lecture and laboratory.

3) Questionnaire procedure: I-scores were obtained by presenting a list of teaching behaviors with instructions. The general instructions are reproduced in Appendix A. All responses were made on an Opt-Scan response sheet and analyzed via computer.

4) Results: I-score responses are shown in Appendix B on the line marked "OEA." Almost all thirty behaviors revealed variable I-scores to some degree. In Items 11 and 29, however, I-scores were virtually unanimous.

Questionnaire procedures and directions proved satisfactory. Student reactions to individual items were favorable except with regard to Item 24 (should be neatly dressed), where 9 out of 47 students objected strongly enough to omit a response to the question.

E. Procedure and results of the first study (Code: OEI):

1) Rationale: The intention of OEI was to present the 30 teaching behaviors in several classes, to collect I-scores based upon the behaviors, and to obtain the overall evaluation of the instructor (E_T-score). The objectives were (1) to ascertain the stability of I-scores as the subject matter and subject level changed, (2) to test the independence of I-scores with the E_T-score, through correlation, and (3) to ascertain whether presentation order in the questionnaire could affect I-scores.

2) Sample characteristics: The student sample in OEI consisted of 126 Hofstra University undergraduates in one of four classroom situations: (1) an introductory Art History class, (2) an advanced Art History class, (3) an introductory Math class or (4) an advanced Math class. Both levels of each subject area were taught by the same instructor. The subjects above were chosen for their dissimilarity in philosophy and in approach.

3) Questionnaire procedure: I-scores in OEI were obtained by presenting the same list of teaching behavior as used in OEA, with the same directions and response format (Appendix A). E_T-scores were also obtained (See Appendix C).

Each class group was divided randomly into three order groups, by dividing the 30 behaviors into sets (designed A, B, and C) of 10 each, and assigning one of three orders (ABC, BCA, CAB) of the sets to each order group.

4) Data analysis: Differences in mean I-score due to classroom situation for each of 30 teaching behaviors were tested via a 2X2 analysis of variance (ANOVA) procedure, with two levels of subject matter (Math vs. Art History) and two levels of subject level (Introductory vs. Advanced). To determine I-score vs. E_T-score independence, correlational tests were performed. Chi-square analysis investigated the relationship of three questionnaire orders and the I-score response distribution for each item.

5) Results: I-score responses are shown in Appendix B on the line marked "OEI." As in OEA, almost all thirty behaviors revealed variable I-scores to some degree. Discussion of I-score distributions in OEI vs. I-score distributions in OEA will be deferred until Section H.

With regard to the influences of subject area, and subject level on I-scores of the 30 teaching behaviors studied,

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the analysis results is shown in Appendix D. Subject area as a variable influenced only I-scores for Items 3, 7, 8, 27 and 30. Subject level as a variable influenced only I-scores for Item 22. The interaction of Area and Level influenced only I-scores of Items 5, 13 and 25. In all, only nine F-tests out of ninety performed (10%) were significant at the .05 level. Since by chance alone, 5% would have been significant, it is concluded that the 9 significant tests are not reliable enough for a detailed examination here. Tentatively, one may conclude that subject level and subject area, as dissimilar as Math and Art History, have only minimal effects on I-scores for the 30 behaviors studied here.

Correlational tests in OEI for relation of the 30 I-scores to the E_T-score revealed seven (23%) significant associations (Items 1, 9, 10, 12, 13, 15, and 23). Since 23% (7/30) was not significantly different from 5% predicted from change (t-test for proportions), further discussion of the particular significant I-scores does not seem warranted (reported in Appendix E under OEI).

Analysis of variance tests of differences in I-score for each of thirty items by virtue of order-group revealed only a single significant result (regarding Item 1). Since 1 or 2 significant order-group effects would have been predicted by chance alone (given the .05 level of significance) from F-tests performed, the particular significance cited here was ignored.

F. Procedure and results of the second study (Code: OEII)

1) Rationale: Since OEA and OEI had laid the groundwork for accepting the I-score as a somewhat reliable measure, the intention of OEII was to present 20 teaching behaviors in each of two individual questionnaire forms, administered simultaneously) and obtain, not only I-scores, but E, O, D, S, and E_T-scores as well. In addition, demographic information of the student was obtained for later analysis (Appendix F).

2) Sample characteristics: The student sample in OEII consisted of 132 Nassau Community College undergraduates all having in one of five sections the same Psychology instructor, with 65 having one set of 10 behaviors and 67 having the other set of 10 behaviors. Questionnaire administration time necessitated the division of test items to sets of 10. The two groups were relatively equivalent in sex, school class, major/nonmajor distintion, and expected grade from the course.

In the results to be reported below in OEII, the 20 items will be analyzed as a single group, regardless of which

set of 10 each item belonged.

3) Questionnaire procedure: Behaviors in OEII were taken from earlier studied ones in OEA and OEI (Items 1, 3, 5, 7, 8, 10, 12, 13, 14, 15, 16, 18, 19, 21, 22, 25, 27, 28, 29, and 30). The instructions regarding I-scores, E-scores, O-scores, and S-scores are reproduced in Appendix G, H, and J respectively. The general directions are reproduced in Appendix K. Wording of questions for OEII and OEIII studies are shown in Appendix L.

D-scores were computed from the I-scores and O-scores of each item.

4) Data analysis: In OEII, the issue of independence of I-scores, O-scores, D-scores, and E-scores, from the E_T-score was engaged via correlational tests. In addition, the possible influence of the student's sex and anticipated grade upon the above scores was tested via a 2X3 ANOVA design, with two levels of sex (male or female) and three levels of anticipated grade (A, B, C or lower).

5) Results: With regard to I-scores in OEII, correlations with E_T-scores revealed significant results in only two of the possible twenty items (Items 12 and 25) as depicted in Appendix E. The distributions themselves are reported in Appendix B on the line marked "OEII." The ANOVA results on the demographic effects are seen in Appendix M, showing one significant effect (an interaction of sex and grade) in Item 18, out of a possible sixty tests. The minimal effects upon I-scores adds a substantial degree of confirmation earlier tests of stability performed on OEA and OEI.

In contrast, with respect to E-scores in OEII, significant correlations with E_T-scores, depicted in Appendix E, were frequently observed. Eighteen items showed a significant relationship between E_T-score and E-score. In only two cases, Item 13 and 25, was independence indicated. The ANOVA results on the demographic effects of sex and anticipated grade are seen in Appendix M. Significance was seen in six items out of the twenty (Items 5, 10, 14, 21, 22, and 29). Sex was a factor for evaluatively reacting to how the instructor followed an outline (Item 21). Anticipated grade influenced the rating on stating material (Item 5), description of course requirements (Item 10), out-goingness (Item 14), and clarity of explanation (Item 22). An interaction effect was seen regarding the instructor's friendliness rating (Item 29).

With respect to O-scores in OEII, significant cor-

relations with E_T-scores, depicted in Appendix **C**, were observed in twelve out of the twenty items (Items 1, 5, 8, 13, 14, 15, 16, 18, 22, 27, 28, and 30), with coefficients ranging from +.25 to +.52. Independence from E_T-score was indicated in how frequently the instructor assigned homework (Item 3), displayed intellectual broadness (Item 7), described course requirements (Item 10), was sarcastic (Item 12), was flexible (Item 19), followed an outline (Item 21), overdemanded (Item 25) and was unfriendly (Item 29). The ANOVA results for the demographic effects are seen in Appendix M. Significance was achieved in six items out of a possible twenty. Sex was a factor in estimating how frequently the instructor generated excitement (Item 8) and followed an outline (Item 21). Anticipated grade influenced observations regarding organization (Item 13), outgoing behavior (Item 14) and level of presentation (Item 30). No interaction effects were observed.

With respect to D-scores in OEII, only eight of the correlations with E_T-score were significant (depicted in Appendix **C**). Twelve items were independent of the E_T-score with regard to their D-scores. As will be discussed later, the fewer number of significant D-score correlations with E_T-scores relative to significant E-score correlations may bode well for the possible use of D-scores in evaluation. The ANOVA tests for D-scores were not performed.

While an extended survey of the results of OEII will be deferred until after the description of OEIII, a few statements can be made here. When correlations are compared between various scores and the E_T-score, one sees the E-score as having the most frequent associations (18), followed in frequency by O-scores (12), and D-scores (8). I-scores carried the least frequent statistical associations (2) with the E_T-score. One sees in part a similar relationship in the ANOVA results. The E-scores and O-scores were relatively more affected by the sex of the student and the anticipated grade than were I-scores. D-scores were not a part of the analysis in OEII.

G. Procedure and results of the third study (Code: OEIII):

1) Rationale: Another study was undertaken principally as a replication and extension of OEII. In OEIII, a larger population received a total of 10 teaching behaviors and the usual I, E, O, D, S, and E_T-scores were obtained. Demographic influences as well as independence from the E_T-score were investigated in OEIII as in OEII.

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2) Sample characteristics: The student sample in OEIII consisted of 121 Nassau Community College undergraduates all having in one of five sections the same Psychology instructor.

3) Questionnaire procedure: Behaviors in OEIII were taken from one of the two sets studied in OEII. This included the ten behaviors of Items 8, 12, 14, 15, 19, 21, 25, 27, 29, and 30 (Appendix B). The same procedure and instructions were used in OEIII as was used in OEII (Appendix F through K).

4) Results: The distributions of I-scores in OEIII are described in Appendix B, on the line marked "OEIII," for the ten behaviors studied. Only one correlation of an I-score with the E_T-score (Item 21) was observed (Appendix E). Since zero or one correlation out of 10 might result from chance alone, this single correlation was ignored. The ANOVA tests for influence of sex and anticipated grade on I-score showed significance in Item 8 (generating excitement) and 27 (up-to-date competence), (Appendix M).

With respect to E-scores in OEIII, significant correlations with the E_T-score were observed in eight of the ten items (Items 8, 14, 15, 19, 21, 27, 29, and 30), as depicted in Appendix E. Item 12 (related to the instructor's sarcasm) and 25 (over-demandedness) had E-scores which were independent of the E_T-score. The ANOVA results on demographic influences in OEIII revealed only Item 27 having any sex, anticipated grade or interaction effect (Appendix M), out of 30 F-tests performed. Again, due to possible chance effects, the single significance was ignored.

With respect to O-scores in OEIII, significant correlations with the E_T-score were observed in eight of the ten items (Items 8, 12, 14, 15, 19, 27, 29, and 30) as depicted in Appendix E. Items 21 (related to following an outline) and 25 (related to over-demanding) had O-scores independent of the E_T-score. The ANOVA results (Appendix M) revealed none of the 10 items having O-scores that were significantly influenced by either sex or anticipated grade.

With respect to D-scores in OEIII, significant correlations with the E_T-score were observed in seven of the ten items (Items 8, 12, 15, 19, 27, 29, and 30), as depicted in Appendix E. Items 14 (related to outgoingness), 21 (related to following an outline) and 25 (related to over-demanding) had D-scores independent of the E_T-score. The ANOVA results for demographic influences (Appendix M) revealed that sex was

a significant factor for D-scores on Item 8 (generating excitement) and 19 (flexibility) and an interaction effect of sex and anticipated grade was seen in the D-scores for Item 19 (flexibility).

While an extended survey of the results of OEIII will be deferred to a later section (Section I), a few statements can be made here. When correlations are compared between various scores and the E_T-score, one sees that, as in OEII, the I-scores carried the least frequent statistical associations (1 out of 10) with the E_T-score. Comparisons regarding the other scores are less clear-cut in OEIII than in OEII. In OEIII, it was seen that E-scores had 8 out of 10 possible associations significant at the .05 level, O-scores also having 8 out of 10, and D-scores having 7 out of 10. A clearer picture, however, will emerge in Section I when OEII and OEIII results are directly compared.

H. I-score distributions and characteristics in OEA, OEI, OEII and OEIII:

The distributions of I-scores from as many as four studies (ten behaviors were analyzed in OEA, OEI, OEI, OEII, and OEIII) are seen in Appendix B. Since the student sample of OEA and OEI differed substantially from that of OEII and OEIII, it seems most reasonable to look at the latter two sets of distributions as a test for I-score distribution reliability aside from possible changes due to population differences. Appendix N abstracts from Appendix B those ten behaviors studied in both OEII and OEIII. While Chi-Square tests were not performed on the pairs of distributions, each member of the pair matches the other to a substantial degree.

Correlational tests of I-scores with the E_T-score in OEI, OEII and OEIII are summarized in Appendix O. It is clear that correlations of I-score and E_T-scores are predominantly nonsignificant. It seems also instructive to point out that none of the 10 significant correlations of any one study was replicated. One may then conclude that I-scores are independent of the over-all evaluation of an instructor.

The ANOVA tests of demographic influence in OEII and OEIII are summarized, again in a box-score format, in Appendix O. Clearly sex and anticipated grade have next to no influence on I-scores.

I. Comparisons of I, D, O, and D-score correlations with the E_T-score in OEII and OEIII:

In the results sections of OEII and OEIII, it was

noted that the comparable extent of statistical association with E_T-scores for I, E, O, and D-scores was not consistent as one analyzed OEII *vs.* OEIII data (Appendix E). To obtain a clearer picture, it was first noted that for some of the 10 items in both OEII and OEIII questionnaires, a significant result in OEII was not observed in OEIII and, of course, vice versa.

Specifically, consistent results were obtained for 7 out of 10 I *vs.* E_T correlations, 7 out of 10 O *vs.* E_T correlations, 9 out of 10 E *vs.* E_T correlations, and 7 out of 10 D *vs.* E_T correlations. From those correlations that gave consistent answers (e.g., were replicated) regarding significance *vs.* nonsignificance, a conservative comparison of I, E, O, and D-scores can be made.

Significant (at the .05 level) associations with the E_T-score were obtained for 0 out of 7 I *vs.* E_T correlations, 8 out of 9 E *vs.* E_T correlations, 5 out of 7 O *vs.* E_T correlations and 4 out of 7 D *vs.* E_T correlations. It is noteworthy that the E-score has a substantially greater association with the E_T-score than has the D-score. It is also readily apparent that the I-score has virtually no association with the E_T-score.

J. Relationship of D-scores and E-scores in OEII and OEIII:

In the proposal (Pp. 4-8), the concept of discrepancy estimation was proposed as a model of evaluation in teacher rating situations. Although mention was made there of the C. H. Coombs ideas about discrepancy scores (D-scores in this project), it seems advantageous to restate some of his theoretical predictions and those of some competing conceptions.

1) Theoretical models and their predictions: According to a theory of cognitive discrepancy, the I-score point represents a reference point from which evaluational statements are derived. The theory asserts that a student's evaluation of some teaching attribute is formed by estimating the discrepancy between his ideal for behavior related to that attribute and what the student sees his teacher do. When the real-ideal discrepancy, or absolute difference between his ideal point and his observation point, is small, the teacher gets a high rating ("superior," "excellent") and if the teacher's behavior is far from the student's ideal, the discrepancy is large and the teacher sets a low evaluation ("poor," "incompetent"). The formula for a discrepancy theory (Formula 1) is the following:

$$\text{E-score}_X = \left| \text{O-score}_X - \text{I-score}_X \right|$$

X = particular teaching attribute or behavior.

The representation of the discrepancy formula on a rating scale is given in Figure 1, where it is seen that Student A has evaluated the instructor more favorably than has Student B.

The discrepancy analysis also asserts that two people, both giving a particularly bad rating ("poor") of an instructor, may have estimated two different discrepancies if the two raters started out with different reference points or I-scores. In Figure 2, Student A has his I-score in the middle of the distribution of possible ideals. When a discrepancy between I_A and O_A is calculated, the distance is the maximum that can be derived given the distribution of possible observations and the particular I of Student A. On the other hand, Student B with his I-score to the extreme end of the distribution of possible ideals, in Figure 2, would perceive a discrepancy between I_B and O_B as the maximum that could be derived given the distribution of possible observations and his particular I (that of Student B). Since both students A and B perceived maximum discrepancies from their respective I-points, both students would rate (E-score) the instructor as "poor." In other words, seemingly identical E-scores would be produced even though they reflect very different O vs. I discrepancies (D-scores).

An empirical test of the discrepancy theory described above is twofold. First, if the E-score is calculated by the rater relative to the rater's personal I-score on some behavior, then there should be a significant correlation between the D-score and E-score on each behavior for all students, no matter where the I-score lies. Since high D-scores imply a large discrepancy and high E-scores are measured by the scales used in OEII and OEIII (See Appendix H), the correlations predicted by descrepancy theory would be positive in nature. The D vs. E-score correlations in OEII and OEIII will be reported for all students as well as for students broken down into the five possible categories of I-score response. Second, if the identical E-scores may indeed be dissimilar discrepancy scores, then one may observe average (mean) D-scores, which have a common E-score, varying systematically by virtue of the I-score of the rater. The mean D-scores of every behavior in OEII and OEIII will be reported for all categories of E-score and all categories of I-score.

An alternative explanation for the original student

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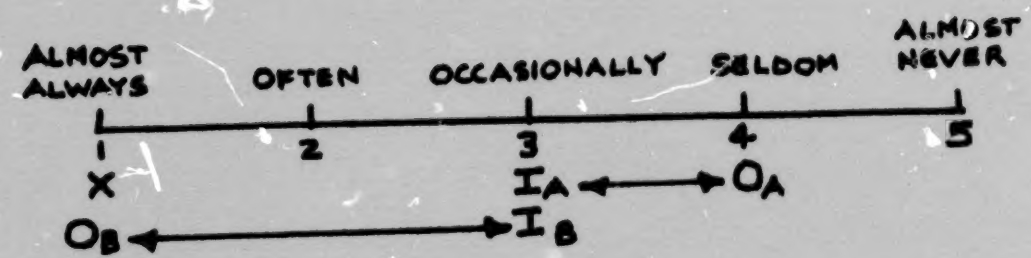
STUDENT A YIELDS E_A

STUDENT B YIELDS E_B



IF $E_X = |O_X - I_X|$ THEN

E_A IS BETTER THAN E_B

IF $E_X = |O_X - k|$ THEN

E_B IS BETTER THAN E_A

Figure 1. A hypothetical scale-rating of one teacher by two hypothetical students.

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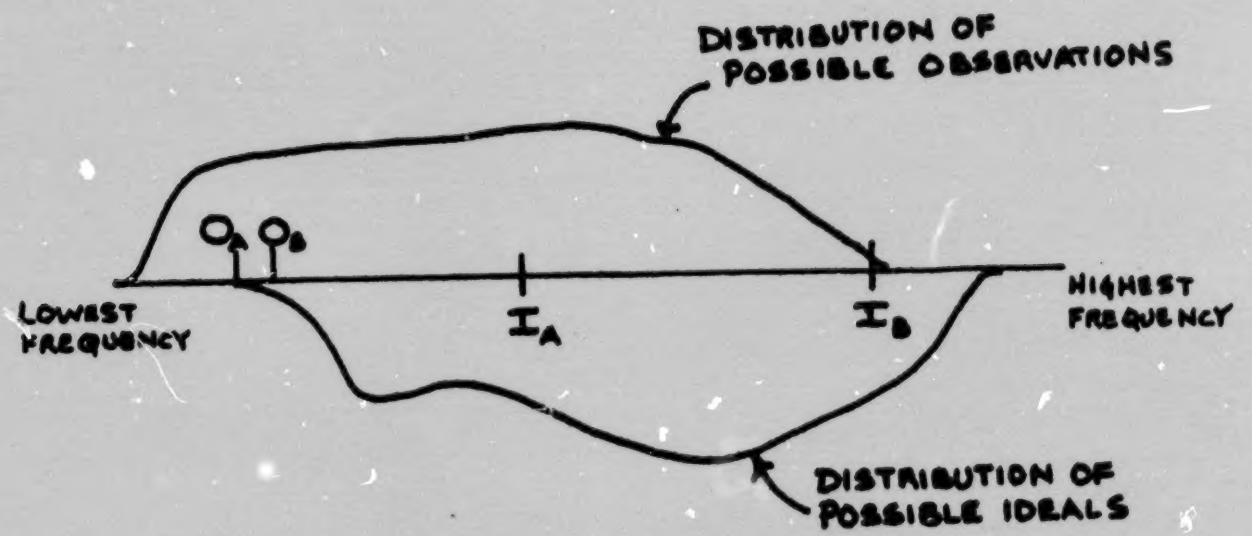

$|I_A - O_A|$ IS MAXIMAL DISCREPANCY FOR STUDENT A, HENCE "POOR"

$|I_B - O_B|$ IS MAXIMAL DISCREPANCY FOR STUDENT B, HENCE "POOR"

EVEN THOUGH $|O_A - I_A| < |O_B - I_B|$

Figure 2. Hypothetical distribution of ideals and observations.

evaluations, in direct opposition to real-ideal discrepancy theory, is the assertion that E-scores are not derived from a personal ideal but rather derived for all raters from a common reference point. This common reference point would be the extreme end point of the frequency scale. The formula for the non-discrepancy theory (Formula 2) is the following

$$\text{E-score}_X = \left|\text{O-score}_X - K\right|$$

X = particular teaching attribute or behavior.
K = extreme end of the frequency continuum.

The contrast between two theories of student evaluations is apparent in Figure 1, where it is seen that, if Formula 1 were true, the E-score from Student A would be better than the E-score from Student B, but that, if Formula 2 were true, the E-score from Student B would be better than Student A.

In analogy to the discussion above, an empirical test for non-discrepancy theory would be performed by looking at D-score vs. E-score correlations and by looking at mean D-scores. Specifically, if Formula 2 were true, then the E-scores should correlate with D-scores only when the I-score is at the extreme end of the frequency score and no correlation should be seen for the other I-score categories. However, the E-scores should correlate with O-scores for all I-score categories since K in Formula 2 functions essentially as a constant for all raters. Mean D-scores associated with a particular E-score should not change in any systematic way as a function of I-score categories, according to non-discrepancy theory.

2) Correlational tests of D and E-scores in OEII: As is shown in Appendix P, correlational tests for ten behaviors studied in OEII reveal overall associations between D-scores and E-scores in 5 items (Items 8, 15, 21, 27, and 30). Four of these items (Item 8, 15, 27, and 30) also had significant D vs. E correlations when considering only the first I-score categories (the extreme frequency point on the scale). Correlational values in these items for those in the extreme I-score category ranged from +.65 to +.88. Importantly, there were few significant D vs. E correlations in I-score categories other than the extreme one. Item 15 is a good example of a high correlation overall (r=+.43), but attributed predominantly to a very high correlation in only one I-score category (r=+.88).

3) Mean D-score analysis over I-score categories in OEII: Appendix R shows the mean values of D-score for ten behaviors in OEII, broken down to all possible E-score and I-score categories (25 possible combinations). First of all, one can see that for those items in OEII for which there is a significant overall correlation between D-score and E-score (Items 8, 15, 21, 27, and 30), the mean D-scores for each E-score category change systematically, as would be logically predicted. It is also apparent that it is not easy to discern a systematic variation of mean D-score in any E-score category as one varies the I-score. Discrepancy theory would say that mean D-scores which share a common E-score should be smaller for middle-of-the-scale I-score categories than for extreme-end I-scale categories.

In a few cases, one observes patterns predicted by discrepancy theory. In E-score category 3 for Items 8, 15, 19, 21, and 30, one observes a pattern of decreasing D-scores as from the extreme to middle I-score categories. However, two points must be made regarding any strong conclusions. First, the N values of each category are very small, and, second, the patterns that are observed are relatively infrequent. If discrepancy theory were a pervasive fact of life then one would expect to see more such patterns than actually were seen. The next study, OEIII, with an increased N, hopefully, would produce more persuasive information.

4) Correlational tests of O and E-scores in OEII: Appendix Q shows that all nine analyzed items in OEII show overall associations between O-scores and D-scores. It is also apparent that the high correlation maintains itself for a greater number of I-score categories in OEII than was observed in the earlier section on D vs. E-score correlations. Item 14 is an example of an overall O vs. E correlation of +.76 being also observed for I-score categories 1, 2, and 3. This finding casts considerable doubt on the validity of Formula 1, as discussed earlier, and in turn the validity of discrepancy theory.

5) Correlational tests of D and E-scores in OEIII: As seen in Appendix P, overall correlations between D-scores and E-scores in OEIII were significant in six of the 9 items analyzed in OEIII (Items 8, 14, 15, 19, 27, and 30). It should be pointed out that only four items (Items 8, 15, 27, and 30) showed significant overall correlations in both OEII and OEIII. As was seen in OEII, the D vs. E correlations in OEIII were significant only when the I-score category was on the extreme end of the frequency scale.

6) Mean D-score analysis over I-score categories in OEIII: One of the intentions of OEIII was to expand the N

values from which mean D-scores could be more easily observed. Appendix S shows the mean D-scores for combinations of E-score and I-score in the 10 items in OEIII. As in OEII, there are a few items which show decreasing mean D-score values as I-scores go from extreme to middle (under E-score category 3 for Items 8, 12, 14, 19, 21). Items 8, 12, 19, and 21 contain patterns in both OEII and OEIII which are predicted by discrepancy theory. Again, however, it is equally easy to see patterns of D-score values which are not predicted by discrepancy theory. Consequently, the information even in OEIII with the increased N does not show clear evidence for the logical implications of Formula 1.

7) Correlational tests of O and E-scores in OEIII: Appendix Q reveals that the O vs. E correlations in OEIII replicate the essential findings of OEII. Nine of the ten items in OEIII showed overall correlations between O-scores and E-scores and some degree of maintenance of that correlation when broken down into I-score categories. Item 14, as an example, has an overall correlation of +.62 which in I-score categories 1, 2 and 3 is +.57, +.61, +.63 respectively.

8) Conclusions: The empirical tests reported above in Section J favor a non-discrepancy theory of student evaluations. In turn, they cast serious doubt on the Coombsian discrepancy theory which was presented in the form of Formula 1. A further discussion will follow in Section L of this Report.

K. Predictions of an aggregate of E-scores:

In the Proposal for this program of research, a good deal of discussion was made of the possible prediction of an overall evaluation (E_T-score) by virtue of combining (via a given formula) separate evaluations of specific teacher behaviors. It was suggested that a combination of one rater's D-scores, regarding a set of behaviors, would provide the better means for predicting that rater's E_T-score than an equivalent combination of E-score: The reasoning behind this assertion lies in the purported superiority of the D-score over the E-score, as being more valid an indicator of a student's perception of a teacher. A sideline interest in aggregations using the S-score as a weighting factor. Presumably, the S-score would indicate how salient a given behavior is in the rater's eyes and how important that behavior would be in a general evaluation of the teacher.

1) Procedure in OEIII: Each of the 123 student raters in OEIII gave D-scores for 10 behaviors, E-scores for 10 be-

haviors, and a single E_T-score. For each rater, the mean D-score was calculated over the 10 behaviors and the mean E-score was calculated over the same 10 behaviors. For each rater, the mean D-score and the mean E-score was correlated with that rater's E_T-score.

In addition, for each rater, the mean D-score and mean E-score was calculated over the 10 behaviors, using as a multiplicative weighting factor the S-score for each behavior. Since the highest salience score was 5 (in a range from 1 to 5), no transformation of S-scores was necessary. The formulas for the weighted average of each rater were as follows:

$$S*E = \sum_{i=1}^{10} S_i \, E_i \quad \text{or} \quad S*D = \sum_{i=1}^{10} S_i \, D_i$$

i = one of the ten behaviors
S_i = the S-score for behavior i
E_i = the E-score for behavior i
D_i = the D-score for behavior i

Values obtained for each of 123 raters were then correlated to E_T-score of each rater.

2) Results in OEIII: The findings from this analysis is summarized in Appendix T. The correlations between mean E-scores and E_T-scores, and between mean D-scores and E_T-scores were virtually identical ($r=+.56$ vs. $r=+.58$) and not impressively high. The correlation of D-scores and E-scores from single behaviors vs. E_T-scores were often of this magnitude or higher (See Appendix E).

Similar correlations between S*E and E_T-scores, and between S*D and E_T-scores, produced little or no improvement. Appendix T shows that now the correlations were +.55 and +.57, respectively.

Since the aggregation formulas were so inadequate, no other analyses were made. The attention was focussed on the issues of discrepancy theory, discussed in Section J.

L. General summary, conclusions and future plans:

While rather specific interpretations of the data collected are made in earlier sections of this Final Report, some major conclusions should be made here as the report draws to an end:

1) Regarding the characteristics of I-scores, one can well say from all four studies that there is sufficient variability in I-score response for one to dispel the appealing hypothesis that an educator can decide a single ideal frequency of behavior and assume a correspondence to the view of the students. In addition, Appendix B shows that many teaching behaviors do not show an extreme frequency as the modal ideal response. The appearance of non-monotonicity in I-score clearly makes difficult any simple transformation of observation scores into an evaluative statement regarding teaching behavior.

2) While I-scores are variable, the data shows that the distribution of I-scores are rather stable with regard to the sex of the student, the anticipated grade of the student, the course content, the course level, or the actual overall evaluation of the teacher (Appendix D, E, and M). A comparison of I-score distributions from OEII and OEIII in Appendix N reveals a kind of reliability of I-score response over differences in teacher and student population.

The stability seen in I-score distributions seen in this project does not, however, ensure stability from other sources. For example, it is possible that I-score distributions may vary as a result of differences in classroom procedure, e.g., lecture vs. discussion. Future studies should investigate the importance of teaching style, as well as course content or course level of instruction.

3) The heart of the program was an attempt to validate the assertion that evaluational responses were the result of cognitive discrepancy calculations between a perceived ideal frequency and a perceived observed. The conclusion drawn from the data is that an evaluational statement, as in an E-score, is not constructed from a discrepancy between that student's O-score and his I-score, but rather more likely constructed from a discrepancy between that student's O-score and the extreme end of the I-score scale. The calculation of mean D-scores in Appendix R and S show little or no changes as the I-score (supposed reference point) varies.

The result appears paradoxical. I-scores show variability and, from the student's report, are sincere and meaningful. Yet, the I-score apparently does not play a role in the creation of an evaluation of the teacher's behavior. A resolution of this paradox may come from two avenues of future experimentation. One avenue can be termed the Proximity Problem; the other avenue can be termed the Semantic Problem.

The Proximity Problem involves basic structure of the

questionnaire. The first page elicited I-scores; the second page, E-scores; and the third page, O-scores. While it was deliberately stated in the instructions that the I-scores be related to the specific course and situation, it is possible that answering the I-score section was done on an abstract level, without relating notions about I-scores to actual evaluative feelings. If the I-score and the O-score were more proximal in spatial terms, the derived D-score might be more closely related to evaluative feelings about a particular behavior of the teacher. A study, planned for the summer of 1974, will vary the ordinal relationships of the I-score, E-score and O-score questions and also vary the proximity between the I-score and O-score portions of the questionnaire. If the non-participation of I-scores in evaluation were due to spatial factors, then as proximity of I-score and O-score increased, so would the importance of the I-score in the calculation of teacher evaluations.

The Semantic Problem involves the necessity in the studies reported here of re-wording a teacher behavior (where scales of I-score and O-score could be constructed) into a teacher attribute (where scales of E-score could be constructed.) As can be seen in Appendix L, in some instances the transfer could be made easily (e.g., "Was (should be) flexible" to "Flexibility"). In some instances, the transfer could have created semantic error (e.g., "Asked more than students could do" to "Burden of assignments"). An improvement might be seen by presenting the evaluational question not as an attribute with a scale from "outstanding" to "poor" but rather as a behavior with a scale from "very satisfied" to "very dissatisfied." While the two formats of an evaluation may be closely related, the latter format may prove more understandable to a student respondent. It is possible that with semantic error reduced, the role of the I-score in evaluation may be observed. A study, also planned for the summer of 1974, will compare the format styles of E-scores as described above.

If the proximity of I-score and O-score questions were maximized and if the potential semantic error in behavior vs. attribute wording were minimized, and if I-scores were still seen as not playing a role in the evaluational process, then there would be little served by incorporating student ideals in teacher evaluation scales. The concept, however, of student perceptions of teaching ideals appears too valuable from a sociological view for an easy dismissal, without additional analysis and experimentation. The present research can be viewed as a cautionary position regarding discrepancy theory, not as a final refutation.

Appendix A

General Instruction Page for OEA and OEI Questionnaires

This questionnaire should take only 10 or 15 minutes to complete. It will be done anonymously --- therefore do not write your name, ID number or any personal identification on the machine-scorable answer sheets which are enclosed with the evaluation items.

We are interested in your honest judgment of the ideal frequency of behavior for the following 30 items. We would like to know how frequently you as a student in this particular class would like or prefer a given teaching behavior to occur.

If, however, any of the first 30 items appear objectionable or inapplicable, feel free to omit your response to that item.

Each item can be answered by marking any one of five possible frequencies asscciated with that item. Here is a sample item!

Should be friendly.

a. Almost always
b. Often
c. Occasionally
d. Seldom
e. Almost never

If you feel, for example, that the instructor of a course such as this should be friendly or that you would prefer that the instructor be friendly "almost always" you should mark with a pencil the (a) alternative for this item in your answer sheet.

REMINDER: We are NOT interested in how the instructor is, but rather in how the instructor of this course should be.

After you are done with the 30 items, please answer item 31, the general evaluation question located at the end of the item sheet.

Appendix B

Item in Questionnaire	Study Code	Percentage of each Response Mode of I-score[1] 1	2	3	4	5
1. Should demonstrate comprehensive knowledge of his/her subject.	OEA	80	15	0	2	3
	OEI	80	15	4	1	0
	OEII	53	26	19	2	0
	OEIII	not presented				
2. Should exhibit a sense of humor.	OEA	32	59	9	0	0
	OEI	22	42	31	1	0
	OEII	not presented				
	OEIII	not presented				
3. Should assign much homework.	OEA	0	0	37	27	36
	OEI	2	10	43	23	18
	OEII	2	3	44	29	22
	OEIII	not presented				
4. Should try to show practical applications of the subject matter.	OEA	60	36	4	0	0
	OEI	39	37	18	2	1
	OEII	not presented				
	OEIII	not presented				
5. Should state material clearly.	OEA	85	15	0	0	0
	OEI	87	10	3	0	0
	OEII	88	7	3	2	0
	OEIII	not presented				
6. Should be understanding of students.	OEA	61	36	3	0	0
	OEI	59	34	6	1	0
	OEII	not presented				
	OEIII	not presented				
7. Shoudl display intellectual interests in subjects other than his/her own	OEA	23	30	30	7	0
	OEI	31	31	35	3	0
	OEII	25	25	43	6	2
	OEIII	not presented				

[1]Response mode "1" = "almost always" and response mode "5" = "almost never."

Item in Questionnaire	Study Code	Percentage of each Response Mode of I-score 1	2	3	4	5
8. Should generate excitement about subject being taught.	OEA	47	45	8	0	0
	OEI	59	33	6	2	0
	OEII	65	24	11	0	0
	OEIII	61	32	6	1	0
9. Should maintain a tight control over class.	OEA	11	21	49	13	6
	OEI	11	23	42	14	10
	OEII	not presented				
	OEIII	not presented				
10. Should describe in detail what should be done and how it should be done.	OEA	24	39	28	7	2
	OEI	33	30	22	12	3
	OEII	38	34	25	2	1
	OEIII	not presented				
11. Should be well prepared for class.	OEA	96	4	0	0	0
	OEI	83	14	2	1	0
	OEII	not presented				
	OEIII	not presented				
12. Should be sarcastic with students.	OEA	2	0	22	38	38
	OEI	2	2	12	32	52
	OEII	1	2	23	32	42
	OEIII	0	3	11	25	61
13. Should present the course in a highly organized manner.	OEA	69	25	3	3	0
	OEI	40	40	15	5	0
	OEII	37	31	22	7	3
	OEIII	not presented				
14. Should be dynamic and outgoing	OEA	55	32	13	0	0
	OEI	17	50	29	3	1
	OEII	36	44	19	1	0
	OEIII	35	50	14	1	0
15. Should encourage student participation in class.	OEA	40	30	30	0	0
	OEI	42	37	17	3	1
	OEII	38	41	19	3	0
	OEIII	44	35	18	3	0

Item in Questionnaire	Study Code	Percentage of each Response Mode of I-score 1	2	3	4	5
16. Should tolerate disagreement	OEA	47	38	13	2	0
	OEI	63	26	10	2	0
	OEII	55	36	8	2	0
	OEIII	not presented				
17. Should establish a good rapport with students in the classroom.	OEA	79	21	0	0	0
	OEI	62	31	5	2	0
	OEII	not presented				
	OEIII	not presented				
18. Should allow students to volunteer their own opinions.	OEA	48	33	15	4	0
	OEI	64	29	5	2	0
	OEII	82	16	0	0	2
	OEIII	not presented				
19. Should be flexible about running the course.	OEA	9	37	33	4	4
	OEI	40	34	20	4	2
	OEII	40	41	18	2	0
	OEIII	55	33	12	0	0
20. Should make isolated facts fit into a whole.	OEA	53	33	4	0	0
	OEI	44	37	15	3	1
	OEII	not presented				
	OEIII	not presented				
21. Should follow an outline closely.	OEA	17	47	26	6	4
	OEI	4	7	37	37	5
	OEII	11	34	41	10	3
	OEIII	10	19	50	14	7
22. Should rephrase explanations to clarify points.	OEA	55	36	9	0	0
	OEI	40	35	22	2	1
	OEII	38	42	19	0	1
	OEIII	not presented				
23. Should motivate students to work hard.	OEA	53	28	13	4	2
	OEI	28	45	20	7	0
	OEII	not presented				
	OEIII	not presented				

Item in Questionnaire	Study Code	Percentage of each Response Mode of I-score 1	2	3	4	5
24. Should be neatly dressed.	OEA	32	20	35	11	2
	OEI	17	24	34	16	8
	OEII	not presented				
	OEIII	not presented				
25. Should ask for more than students could do.	OEA	2	4	15	43	36
	OEI	3	6	30	20	41
	OEII	2	3	16	28	52
	OEIII	0	4	15	22	59
26. Should try to relate course material to that of other courses	OEA	28	19	45	6	2
	OEI	19	24	36	14	7
	OEII	not presented				
	OEIII	not presented				
27. Should be up-to-date on contemporary issues related to the course.	OEA	70	26	2	0	2
	OEI	59	30	8	1	0
	OEII	68	19	10	3	0
	OEIII	81	19	0	0	0
28. Should become personally involved with his/her students	OEA	15	23	32	26	4
	OEI	11	20	36	20	13
	OEII	10	25	45	12	9
	OEIII	not presented				
29. Should be unfriendly and aloof.	OEA	0	2	2	8	87
	OEI	1	2	3	18	76
	OEII	1	1	3	1	93
	OEIII	1	0	2	4	93
30. Should present subject matter at a level comprehended by all students in the class.	OEA	45	36	15	2	2
	OEI	52	23	18	6	1
	OEII	69	25	4	0	2
	OEIII	74	21	5	0	0

Appendix C

Overall evaluation question (E_T-score) for OEI, OEII and OEIII.

How would you rate your instructor in general overall teaching ability?

a. An outstanding and stimulating instructor.
b. A very good instructor.
c. A good instructor.
d. An adequate but not stimulating instructor.
e. A poor and inadequate instructor.

Appendix D

ANOVA effects on I-scores in OEI

Questionnaire Item	Subject Area Effect	Subject Level Effect	Interaction Effect
3	$F=5.53$, $p < .05$	N.S.	N.S.
5	N.S.	N.S.	$F=5.99$, $p < .05$
7	$F=5.38$, $p < .05$	N.S.	N.S.
8	$F=5.22$, $p < .05$	N.S.	N.S.
13	N.S.	N.S.	$F=$ 17, $p < .05$
22	N.S.	$F=5.84$, $p < .05$	N.S.
25	N.S.	N.S.	$F=4.87$, $p < .05$
27	$F=24.16$, $p < .001$	N.S.	N.S.
30	$F=7.94$, $p < .01$	N.S.	N.S.

Non-significant Results in any of the above ANOVA tests

Items 1,2,4,6,9,10,11,12,14,15,16,17,18,19,20,21,23,24. 26,28,29.

Note: Of a total of 90 ANOVA tests in OEI, nine were significant at the .05 Type 1 error level.

Appendix E

Correlation of E_T-score with I,E,O,S, and D-score

Item in Questionnaire	Study Code	I-score	E-score	O-score	S-score	D-score
1	OEI	r=+.17 p=.031	-	-	-	-
	OEII	N.S.	r=+.58 p=.001	r=+.30 p=.006	N.S.	N.S.
	OEIII	not presented				
2	OEI	N.S.	-	-	-	-
	OEII	not presented				
	OEIII	not presented				
3	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=-.23 p=.028	N.S.	N.S.	N.S.
	OEIII	not presented				
4	OEI	N.S.	-	-	-	-
	OEII	not presented				
	OEIII	not presented				
5	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.44 p=.001	r=+.49 p=.011	N.S.	r=+.60 p=.001
	OEIII	not presented				
6	OEI	N.S.	-	-	-	-
	OEII	not presented				
	OEIII	not presented				
7	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.43 p=.001	N.S.	N.S.	N.S.
	OEIII	not presented				

Correlation of E_T-score with I,E,O,S, and D-score

Item in Questionnaire	Study Code	I-score	E-score	O-score	S-score	D-score
8	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.52 p=.001	r=+.43 p=.001	r=-.27 p=.014	r=+.26 p=.017
	OEIII	N.S.	r=+.55 p=.001	r=+.61 p=.001	N.S.	r=+.54 p=.001
9	OEI	r=+.27 p=.001	-	-	-	-
	OEII	not presented				
	OEIII	not presented				
10	OEI	r=+.17 p=.030	-	-	-	-
	OEII	N.S.	r=+.28 p=.009	N.S.	N.S.	N.S.
	OEIII	not presented				
11	OEI	N.S.	-	-	-	-
	OEII	not presented				
	OEIII	not presented				
12	OEI	N.S.	-	-	-	-
	OEII	r=+.24 p=.024	r=+.25 p=.021	N.S.	N.S.	N.S.
	OEIII	N.S.	N.S.	r=+.29 p=.001	N.S.	r=+.16 p=.035
13	OEI	r=+.23 p=.004	-	-	-	-
	OEII	N.S.	N.S.	r=+.25 p=.021	N.S.	N.S.
	OEIII	not presented				

Correlation of E_T-score with I,E,O,S, and D-score

Item in Questionnaire	Study Code	I-score	E-score	O-score	S-score	D-score
14	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.52 p=.001	r=+.52 p=.001	r=-.35 p=.002	N.S.
	OEIII	N.S.	r=+.60 p=.001	r=+.60 p=.001	r=-.20 p=.014	N.S.
15	OEI	r=+.23 p=.005	-	-	-	-
	OEII	N.S.	r=+.30 p=.007	r=+.28 p=.011	N.S.	r=+.25 p=.018
	OEIII	N.S.	r=+.29 p=.001	r=+.31 p=.001	N.S.	r=+.36 p=.001
16	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.33 p=.003	r=+.47 p=.001	N.S.	r=+.50 p=.001
	OEIII	not presented				
17	OEI	N.S.	-	-	-	-
	OEII	not presented				
	OEIII	not presented				
18	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.44 p=.001	r=+.35 p=.002	N.S.	r=+.31 p=.005
	OEIII	not presented				
19	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.32 p=.004	N.S.	N.S.	N.S.
	OEIII	N.S.	r=+.38 p=.001	r=+.27 p=.001	N.S.	r=+.21 p=.011

Correlation of E_T-score with I,E,O,S, and D-score

Item in Questionnaire	Study Code	I-score	E-score	O-score	S-score	D-score
20	OEI	N.S.	-	-	-	-
	OEII	not presented				
	OEIII	not presented				
21	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.22 p=.033	N.S.	N.S.	N.S.
	OEIII	r=+.22 p=.007	r=+.31 p=.001	N.S.	r=-.22 p=.006	N.S.
22	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.37 p=.001	r=+.35 p=.002	r=+.20 p=.046	N.S.
	OEIII	not presented				
23	OEI	r=+.18 p=.021	-	-	-	-
	OEII	not presented				
	OEIII	not presented				
24	OEI	N.S.	-	-	-	-
	OEII	not presented				
	OEIII	not presented				
25	OEI	N.S.	-	-	-	-
	OEII	r=+.27 p=.015	N.S.	N.S.	N.S.	N.S.
	OEIII	N.S.	N.S.	N.S.	N.S.	N.S.
26	OEI	N.S.	-	-	-	-
	OEII	not presented				
	OEIII	not presented				

Correlation of E_T-score with I,E,O,S, and D-score

Item in Questionnaire	Study Code	I-score	E-score	O-score	S-score	D-score
27	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.37 p=.001	r=+.30 p=.006	r=-.24 p=.025	r=+.24 p=.024
	OEIII	N.S.	r=+.36 p=.001	r=+.27 p=.001	N.S.	r=+.17 p=.028
28	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.45 p=.001	r=+.28 p=.010	N.S.	r=+.40 p=.001
	OEIII	not presented				
29	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.32 p=.004	N.S.	N.S.	N.S.
	OEIII	N.S.	r=+.46 p=.001	r=-.27 p=.001	N.S.	r=.20 p=.012
30	OEI	N.S.	-	-	-	-
	OEII	N.S.	r=+.60 p=.001	r=+.25 p=.020	N.S.	r=+.25 p=.020
	OEIII	N.S.	r=+.40 p=.001	r=+.45 p=.001	N.S.	r=+.44 p=.001

Appendix F

Background Questions for OEA, OEI, OEII, and OEIII studies.

1. Sex.

   a. Male
   b. Female

2. Grade point average.

   a. 3.6 - 4.0
   b. 3.1 - 3.5
   c. 2.6 - 3.0
   d. 2.1 - 2.5
   e. 2.0 or below

3. Year.

   a. Freshman
   b. Sophomore
   c. Junior
   d. Senior

4. Is this course in the field that you are majoring in?

   a. Yes, this is a course in my field of specialization.
   b. No, this is not a course in my field of specialization.

5. Is this course meeting your expectations? Are you pleased with your decision to take this course?

   a. Yes
   b. No

6. Based on your grades in this course so far, what do you expect to get as a final grade?

   a. A
   b. B
   c. C
   d. D
   e. F

Appendix G

Instructions for I-score responses in OEII and OEIII.

We are interested in your honest judgment of the ideal frequency of teaching behavior for the following 10 items. We want to know how frequently you would like or prefer a given behavior to occur. Each item can be answered by marking any one of the five possible frequencies associated with that item. Here is a sample item.

Should be friendly.

a. Almost always
b. Often
c. Occasionally
d. Seldom
e. Almost never

If you feel, for example, that the instructor should be friendly or that you would prefer that the instructor be friendly or that you would prefer that the instructor be friendly 'almost always,' you should mark the (a) alternative for this item in your answer sheet. Remember: We are not interested in how the instructor is but rather in how the instructor should be.

Appendix H

Instructions for E-score responses in OEII and OEIII.

For the following items we are concerned with an evaluational rating along a five-point scale ("outstanding," "good," "adequate," "fair," or "poor") of this teacher's competence for each given teaching behavior. Each item can be answered by marking any one of the five possible ratings associated with that item. Here is a sample item.

Rapport with students in class.

a. Outstanding
b. Good
c. Adequate
d. Fair
e. Poor

If you feel, for example, that this teacher's "rapport with students in class" was 'good' you should mark the (b) alternative for this item in your answer sheet.

Appendix I

Instructions for O-score responses in OEII and OEIII.

We are interested in your honest judgment of the observed frequency of behavior for the following 10 items. We want to know how frequently you have observed a given teaching behavior to occur in this class. Each item can be answered by marking any one of five possible frequencies associated with that item. Here is a sample item.

Was friendly.

a. Almost always
b. Often
c. Occasionally
d. Seldom
e. Almost never

If you feel, for example, that the instructor is friendly 'almost always' you should mark the (a) alternative for this item in your answer sheet.

Appendix J

Instructions for S-score responses in OEII and OEIII.

We are interested in how important you consider the attribute in arriving at a general, over-all view of teaching effectiveness. We are not interested in how positive or negative the particular attribute is, nor in how the instructor ranks with respect to this attribute, only in how much effect and observation of this attribut would have on an over-all rating of the teacher. Here is a sample item:

Spitting on the floor during class.

a. Of next to no importance
b. Not very important
c. Of only moderate importance
d. Important
e. Extremely important

If you feel, for example, that spitting on the floor during class would be 'extremely important' information in arriving at an over-all rating of the teacher, you should mark the (e) alternative for this item in your answer sheet.

Appendix K

General Instruction Page for OEII and OEIII Questionnaires

This questionnaire is part of a continuing study of teacher evaluation processes under the direction of Dr. Charles F. Levinthal of the Department of Psychology, and funded by the U.S. Office of Education.

We are particularly concerned with the various ways of looking at teaching behaviors. Located at the top of each page you will find a set of specific directions indicating what type of response is required for the items below. If, however, any of the items appear objectionable or inapplicable, you may omit your response to that item.

Each question is numbered and appropriate responses should be made by completely blackening the appropriate space on the enclosed machine scorable answer sheet. After you have finished answering each page of items go to the next page. Do not return to make any changes in your answer.

This questionnaire should take only 20 or 25 minutes to complete. It will be done anonymously --- therefore do not write your name or any personal identification on the answer sheet.

Appendix L

Question Statement Formats for Items used in both OEII and OEIII

Item No.	Format for I and O scores	Format for E and S scores
8	(Should) generate excitement about subject being taught.	Generating excitement about subject.
12	(Should) be sarcastic.	Sarcasm
14	(Should) be dynamic and outgoing.	Dynamic and outgoing.
15	(Should) encourage student participation in class.	Encouragement of class participation.
19	(Should) be flexible about running the course	Flexibility about running the course.
21	(Should) follow an outline closely.	Following an outline closely.
25	(Should) ask for more than students could do.	Burden of assignments.
27	(Should) be up-to-date on contemporary issued related to the course.	Competence in recent advances in field.
29	(Should) be unfriendly and aloof.	Friendliness
30	(Should) present subject matter at a level comprehended by all students in the class.	Ability to present subject matter comprehensibly to total class.

Appendix M

ANOVA effects upon I-scores

Questionnaire Items used in either OEII or OEIII	Study Code	Sex effect	Anticipated grade effect	Interaction
8	OEII	N.S.	N.S.	N.S.
	OEIII	N.S.	F=4.61, p < .05	N.S.
18	OEII	N.S.	N.S.	F=4.22, p <
	OEIII	- - - not presented - - -		
27	OEII	N.S.	N.S.	N.S.
	OEIII	F=4.84, p < .05	N.S.	N.S.

Nonsignificant Results in any of the above ANOVA tests:

Items 1,3,5,7,10,12,13,14,15,16,19,21,22,25,28,29,30
(presented in OEII)

Items 12,14,15,19,21,25,29,30
(presented in OEIII)

Note: Of a total of 90 ANOVA tests in OEII and OEIII, three were significant at the .05 Type 1 error level.

ANOVA effects upon E-scores

Questionnaire Items used in either OEII or OEIII	Study Code	Sex effect	Anticipated grade effect	Interaction
5	OEII	N.S.	$F=4.65$, $p < .05$	N.S.
	OEIII	- - - not presented - - -		
10	OEII	N.S.	$F=4.25$, $p < .05$	N.S.
	OEIII	- - - not presented - - -		
14	OEII	N.S.	$F=4.16$, $p < .05$	N.S.
	OEIII	N.S.	N.S.	N.S.
21	OEII	$F=6.99$, $p < .05$	N.S.	N.S.
	OEIII	N.S.	N.S.	N.S.
22	OEII	N.S.	$F=5.81$, $p < .01$	N.S.
	OEIII	- - - not presented - - -		
27	OEII	N.S.	N.S.	N.S.
	OEIII	$F=5.84$, $p < .05$	N.S.	$F=3.41$, $p < .05$
29	OEII	N.S.	N.S.	$F=3.29$, $p < .05$
	OEIII	N.S.	N.S.	N.S.

Nonsignificant Results in any of the above ANOVA tests:

Items 1,3,7,8,12,13,15,16,18,19,25,28,30
(presented in OEII)

Items 8,12,15,19,25,30
(presented in OEIII)

Note: Of a total of 90 ANOVA tests in OEII and OEIII, eight were significant at the .05 level, and one was significant at the .01 level.

ANOVA effects upon O-scores

Questionnaire Items used in either OEII or OEIII	Study Code	Sex effect	Anticipated grade effect	Interaction
1	OEII	N.S.	N.S.	$F=4.00$, $p < .05$
	OEIII	- - - not presented - - -		
8	OEII	$F=5.03$, $p < .05$	N.S.	N.S.
	OEIII	N.S.	N.S.	N.S.
13	OEII	N.S.	$F=3.22$, $p < .05$	N.S.
	OEIII	- - - not presented - - -		
14	OEII	N.S.	$F=4.86$, $p < .05$	N.S.
	OEIII	N.S.	N.S.	N.S.
19	OEII	N.S.	N.S.	$F=4.04$, $p < .05$
	OEIII	N.S.	N.S.	N.S.
21	OEII	$F=6.99$, $p < .05$	N.S.	N.S.
	OEIII	N.S.	N.S.	N.S.
30	OEII	N.S.	$F=8.97$, $p < .01$	N.S.
	OEIII	N.S.	N.S.	N.S.

Nonsignificant effects in any of the above ANOVA tests:

Items 3,5,7,10,12,15,16,18,22,25,27,28,29
(presented in OEII)

Items 12,15,25,27,29
(presented in OEIII)

Note: Of a total of 90 ANOVA tests in OEII and OEIII, seven were significant at the .05 level, and one was significant at the .01 level.

ANOVA effects upon D-scores

Questionnaire Items in OEIII only	Sex effect	Anticipated grade effect	Interaction
8	$F=4.67$, $p < .05$	N.S.	N.S.
19	$F=4.25$, $p < .05$	N.S.	$F=6.92$, $p < .01$

Nonsignificant results in any of the above ANOVA tests:

Items 12,14,15,19,21,25,29,30
(presented in OEIII)

ANOVA of D-scores not performed for OEII data.

Note: Of a total of 30 ANOVA tests in OEIII, three were significant at the .05 level and one was significant at the .01 level.

Appendix N

Item in Questionnaire	Study Code	Percentage of each response mode of I-score 1	2	3	4	5
8	OEII	65	24	11	0	0
	OEIII	61	32	6	1	0
12	OEII	1	2	23	32	42
	OEIII	0	3	11	25	61
14	OEII	36	44	19	1	0
	OEIII	35	50	14	1	0
15	OEII	38	41	19	3	0
	OEIII	44	35	18	3	0
19	OEII	40	41	18	2	0
	OEIII	55	33	12	0	0
21	OEII	11	34	41	10	3
	OEIII	10	19	50	14	7
25	OEII	2	3	16	18	52
	OEIII	0	4	15	22	59
27	OEII	68	19	10	3	0
	OEIII	81	19	0	0	0
29	OEII	1	1	3	1	93
	OEIII	1	0	2	4	93
30	OEII	69	25	4	0	2
	OEIII	74	21	[illegible]	0	0

Appendix O

Number of significant correlational tests with E_m-score (numerator) relative to number possible (denominator) in OEII and OEIII

Study Code	I-score	E-score	O-score	D-score
OEI	7/30	-	-	-
OEII	2/30	18/20	12/20	8/20
OEIII	1/10	8/10	8/10	7/10

Number of significant ANOVA tests with demographic variables (numerator) relative to number possible (denominator)

Study Code	I-score	E-score	O-score	D-score
OEII	1/60	6/60	6/60	not analyzed
OEIII	2/30	1/30	0/30	3/30

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Appendix P

D-score/E-score correlations

Questionnaire Item	Study Code	Overall I-score categories	Broken down into I-score categories				
			1	2	3	4	5
8	OEII	r=+.40 N=68 p < .01	r=+.75 N=44 p < .01	r=-.18 N=17 N.S.	r=-.71 N=4 N.S.	r=-.21 N=4 N.S.	--- N=0
	OEIII	r=+.43 N=121 p < .001	r=+.62 N=74 p < .001	r=+.25 N=38 N.S.	r=-.64 N=7 N.S.	--- N=2	--- N=0
12	OEII	r=-.13 N=66 N.S.	--- N=1	--- N=1	r=-.44 N=15 N.S.	r=+.37 N=22 N.S.	r=-.43 N=27 N.S.
	OEIII	- - - not analyzed - - -					
14	OEII	r=+.02 N=69 N.S.	r=+.65 N=25 p < .01	r=-.40 N=30 p < .05	r=-.72 N=13 p < .01	--- N=1	--- N=0
	OEIII	r=+.21 N=120 p < .01	r=+.57 N=41 p < .001	r=-.05 N=59 N.S.	r=-.37 N=16 N.S.	--- N=2	--- N=0

D-score/E-score correlations

Questionnaire Item	Study Code	Overall I-score categories	Broken down into I-score categories				
			1	2	3	4	5
15	OEII	r=+.43 N=69 p < .01	r=+.88 N=26 p < .01	r=+.38 N=28 N.S.	r=+.14 N=13 N.S.	--- N=2	--- N=0
	OEIII	r=+.38 N=121 p < .001	r=+.74 N=53 p < .001	r=+.13 N=43 N.S.	r=-.29 N=21 N.S.	r=-.30 N=4 N.S.	--- N=0
19	OEII	r=+.12 N=67 N.S.	r=+.74 N=27 p < .01	r=+.50 N=27 p < .01	r=-.66 N=12 p < .05	--- N=1	--- N=0
	OEIII	r=+.41 N=121 p < .001	r=+.67 N=66 p < .001	r=-.02 N=40 N.S	r=+.08 N=14 N.S.	--- N=0	--- N=0
21	OEII	r=+.23 N=69 p < .05	r=+.32 N=8 N.S.	r=+.28 N=24 N.S.	r=-.46 N=29 p < .01	--- N=6	--- N=2
	OEIII	r=-.01 N=117 N.S.	r=+.74 N=12 p < .01	r=+.15 N=22 N.S.	r=-.21 N=59 N.S.	r=-.18 N=16 N.S.	r=-.37 N=8 N.S.

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D-score/E-score correlations

Questionnaire Item	Study Code	Overall I=score categories	Broken down into I-score categories				
			1	2	3	4	5
25	OEII	r=-.05 N=65 N.S.	--- N=1	--- N=2	r=+.08 N=10 N.S.	r=-.30 N=19 N.S.	r=+.08 N=33 N.S.
	OEIII	r=-.05 N=116 N.S.	--- N=0	r=-.20 N=5 N.S.	r=-.19 N=18 N.S.	r=-.20 N=25 N.S.	r=+.05 N=68 N.S.
27	OEII	r=+.44 N=65 p < .01	r=+.76 N=44 p < .01	r=-.41 N=12 N.S.	r=-.38 N=7 N.S.	--- N=2	--- N=0
	OEIII	r=+.31 N=121 p < .001	r=+.46 N=98 p < .001	r=-.23 N=23 N.S.	--- N=0	--- N=0	--- N=0
29	OEII	r=+.18 N=68 N.S.	--- N=1	--- N=1	--- N=2	--- N=0	r=+.13 N=64 N.S.
	OEIII	- - - not analyzed - - -					

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D-score/E-score correlations

Questionnaire Item	Study Code	Overall I-score categories	Broken down into I-score categories				
			1	2	3	4	5
30	OEII	r=+.49 N=68 p < .01	r=+.68 N=47 p < .01	r=+.14 N=17 N.S.	r=-1.00 N=3 p < .001	--- N=1	--- N=0
	OEIII	r=+.35 N=120 P < .001	r=+.37 N=91 p < .001	r=+.17 N=26 N.S.	--- N=3	--- N=0	--- N=0

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Appendix Q

E-score/O-score correlations

Questionnaire Item	Study Code	Overall I-score categories	Broken down into I-score categories				
			1	2	3	4	5
8	OEII	r=+.74 N=72 p < .001	r=+.76 N=45 p < .001	r=+.78 N=17 p < .001	r=+.28 N=9 N.S.	--- N=1	--- N=0
	OEIII	r=+.61 N=121 p < .001	r=+.63 N=75 p < .001	r=+.50 N=37 p < .001	r=+.65 N=7 N.S.	--- N=2	--- N=0
12	OEII	r=+.5[illegible] N=72 p < .001	--- N=1	--- N=2	r=+.70 N=16 p < .001	r=+.45 N=23 p < .05	r=+.04 N=29 N.S.
	OEIII	r=+.29 N=117 p < .001	--- N=0	--- N=3	r=+.26 N=13 N.S.	r=+.60 N=29 p < .001	r=+.14 N=71 N.S.
14	OEII	r=+.76 N=72 p < .001	r=+.60 N=26 p < .001	r=+.81 N=31 p < .001	r=+.72 N=13 p < .003	--- N=1	--- N=0
	OEIII	r=+.62 N=119 p < .001	r=+.57 N=41 p < .001	r=+.61 N=59 p < .001	r=+.63 N=16 p < .01	--- N=2	--- N=0

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E-score/O-score correlations

Questionnaire Item	Study Code	Overall I-score categories	Broken down into I-score categories				
			1	2	3	4	5
15	OEII	r=+.84 N=72 p < .001	r=+.83 N=26 p < .001	r=+.71 N=29 p < .001	r=+.81 N=14 p < .001	--- N=2	--- N=0
	OEIII	r=+.67 N=121 p < .001	r=+.74 N=53 p < .001	r=+.59 N=43 p < .001	r=+.63 N=21 p < .001	r=-.85 N=4 N.S.	--- N=0
19	OEII	r=+.72 N=72 p < .001	r=+.73 N=27 p < .001	r=+.54 N=31 p < .001	r=+.66 N=12 p < .01	--- N=1	--- N=0
	OEIII	r=+.58 N=120 p < .001	r=+.66 N=67 p < .001	r=+.41 N=39 p < .01	r=-.08 N=14 N.S.	--- N=0	--- N=0
21	OEII	r=+.49 N=72 p < .001	r=+.32 N=8 N.S.	r=+.59 N=25 p < .01	r=+.52 N=30 p < .01	--- N=6	--- N=0
	OEIII	r=+.42 N=117 p < .001	r=+.74 N=12 p < .01	r=+.51 N=22 p < .01	r=+.34 N=59 p < .01	r=+.35 N=16 N.S.	r=+.37 N=8 N.S.

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E-score/O-score correlations

Questionnaire Item	Study Code	Overall I-score categories	Broken down into I-score categories				
			1	2	3	4	5
25	OEII	r=+.21 N=72 p < .05	--- N=2	--- N=2	r=+.09 N=12 N.S.	r=-.30 N=19 N.S.	r=+.17 N=36 N.S.
	OEIII	r=-.02 N=117 N.S.	--- N=0	r=-.20 N=5 N.S.	r=-.20 N=19 N.S.	r=+.16 N=25 N.S.	r=-.05 N=68 N.S.
27	OEII	r=+.42 N=72 p < .001	r=+.38 N=48 p < .01	r=+.18 N=13 N.S.	r=+.38 N=8 N.S.	--- N=2	--- N=0
	OEIII	r=+.52 N=121 p < .001	r=+.46 N=98 p < .001	r=+.68 N=23 p < .001	--- N=0	--- N=0	--- N=0
29	OEII	not analyzed N=71	--- N=2	--- N=1	--- N=2	--- N=1	r=-.13 N=65 N.S.
	OEIII	r=-.49 N=120 p < .001	--- N=1	--- N=0	--- N=2	r=-.61 N=5	r=-.50 N=112 p < .001

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E-score/O-score correlations

Questionnaire Item	Study Code	Overall I-score categories	Broken down into I-score categories				
			1	2	3	4	5
30	OEII	r=+.54 N=72 p < .001	r=+.66 N=48 p < .001	r=+.55 N=18 p < .01	r=+1.00 N=3 p < .001	--- N=0	--- N=2
	OEIII	r=+.34 N=120 p < .001	r=+.38 N=90 p < .001	r=+.20 N=26 N.S.	r=-.19 N=3 N.S.	--- N=0	--- N=0

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Appendix R

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STUDY CODE: OE II

QUESTIONNAIRE ITEM: 8

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}$ = 0.33 N = 27	$\bar{D}$ = 0.71 N = 7	$\bar{D}$ = 1.50 N = 2	--- N = 0	--- N = 0	$\bar{\bar{D}}$ = 0.4 N = 36
2	$\bar{D}$ = 0.93 N = 14	$\bar{D}$ = 0.14 N = 7	$\bar{D}$ = 1.00 N = 3	--- N = 0	--- N = 0	$\bar{\bar{D}}$ = 0.71 N = 24
3	$\bar{D}$ = 1.50 N = 4	$\bar{D}$ = 0.67 N = 3	$\bar{D}$ = 0.50 N = 2	--- N = 0	--- N = 0	$\bar{\bar{D}}$ = 1.00 N = 9
4	--- N = 0	--- N = 0	--- N = 0	--- N = 0	--- N = 0	$\bar{\bar{D}}$ = 0.0 N = 0
5	--- N = 0	--- N = 0	--- N = 0	--- N = 0	--- N = 0	$\bar{\bar{D}}$ = 0.0 N = 0
	$\bar{\bar{D}}$ = 0.62 N = 45	$\bar{\bar{D}}$ = 0.47 N = 17	$\bar{\bar{D}}$ = 1.00 N = 7	$\bar{\bar{D}}$ = 0.00 N = 0	$\bar{\bar{D}}$ = 0.00 N = 0	$\bar{\bar{D}}$ = 0.6 N = 69

STUDY CODE : OE II

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QUESTIONNAIRE ITEM : 12

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	--- N=0	--- N=0	$\bar{D}$=2.33 N=3	$\bar{D}$=0.33 N=3	--- N=0	$\bar{D}$=1.33 N=6
2	$\bar{D}$=0.00 N=1	$\bar{D}$=0.00 N=1	$\bar{D}$=1.00 N=6	$\bar{D}$=0.50 N=4	$\bar{D}$=0.00 N=1	$\bar{D}$=0.62 N=13
3	--- N=0	--- N=0	$\bar{D}$=0.43 N=7	$\bar{D}$=0.20 N=5	$\bar{D}$=1.00 N=10	$\bar{D}$=0.64 N=22
4	--- N=0	--- N=0	--- N=0	$\bar{D}$=0.40 N=5	$\bar{D}$=0.83 N=6	$\bar{D}$=0.63 N=11
5	--- N=0	--- N=0	--- N=0	$\bar{D}$=1.00 N=5	$\bar{D}$=0.46 N=11	$\bar{D}$=0.62 N=16
	$\bar{D}$=0.00 N=1	$\bar{D}$=0.00 N=1	$\bar{D}$=1.00 N=16	$\bar{D}$=0.50 N=22	$\bar{D}$=0.72 N=28	$\bar{D}$=0.69 N=68

STUDY CODE: OE II

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QUESTIONNAIRE ITEM: 14

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}$=0.13 N=6	$\bar{D}$=0.88 N=16	$\bar{D}$=1.50 N=4	--- N=0	--- N=0	$\bar{D}$=0.53 N=36
2	$\bar{D}$=0.89 N=9	$\bar{D}$=0.17 N=2	$\bar{D}$=0.88 N=8	$\bar{D}$=2.00 N=1	--- N=0	$\bar{D}$=0.87 N=20
3	--- N=0	$\bar{D}$=1.00 N=2	$\bar{D}$=0.00 N=1	--- N=0	--- N=0	$\bar{D}$=0.8 N=3
4	--- N=0	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{D}$=0.0 N=0
5	--- N=0	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{D}$=0.0 N=0
	$\bar{D}$=0.40 N=25	$\bar{D}$=0.77 N=20	$\bar{D}$=0.77 N=13	$\bar{D}$=2.00 N=1	$\bar{D}$=0.00 N=0	$\bar{D}$=0.6 N=59

STUDY CODE: OE II

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QUESTIONNAIRE ITEM: 15

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}=0.10$ N=10	$\bar{D}=0.60$ N=5	--- N=0	--- N=0	--- N=0	$\bar{D}=0.27$ N=15
2	$\bar{D}=0.89$ N=9	$\bar{D}=0.25$ N=12	$\bar{D}=1.00$ N=4	--- N=0	--- N=0	$\bar{D}=0.60$ N=25
3	$\bar{D}=1.75$ N=4	$\bar{D}=0.75$ N=8	$\bar{D}=0.13$ N=8	--- N=0	--- N=0	$\bar{D}=0.70$ N=20
4	$\bar{D}=2.67$ N=3	$\bar{D}=1.33$ N=3	--- N=0	$\bar{D}=0.00$ N=2	--- N=0	$\bar{D}=1.5$ N=8
5	--- N=0	--- N=0	$\bar{D}=2.00$ N=1	--- N=0	--- N=0	$\bar{D}=2.$ N=1
	$\bar{D}=0.92$ N=26	$\bar{D}=0.57$ N=28	$\bar{D}=0.54$ N=13	$\bar{D}=0.00$ N=2	$\bar{D}=0.00$ N=0	$\bar{D}=0.6$ N=69

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QUESTIONNAIRE ITEM : 19

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}=0.33$ N=9	$\bar{D}=0.20$ N=5	$\bar{D}=1.50$ N=2	--- N=0	--- N=0	$\bar{\bar{D}}=0.31$ N=16
2	$\bar{D}=1.00$ N=15	$\bar{D}=0.40$ N=15	$\bar{D}=0.60$ N=5	--- N=0	--- N=0	$\bar{\bar{D}}=0.69$ N=35
3	$\bar{D}=2.33$ N=3	$\bar{D}=0.88$ N=8	$\bar{D}=0.25$ N=4	--- N=0	--- N=0	$\bar{\bar{D}}=1.00$ N=15
4	--- N=0	--- N=0	$\bar{D}=0.00$ N=1	$\bar{D}=0.00$ N=1	--- N=0	$\bar{\bar{D}}=0.00$ N=2
5	--- N=0	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{\bar{D}}=0.0$ N=0
	$\bar{\bar{D}}=0.85$ N=27	$\bar{\bar{D}}=0.50$ N=28	$\bar{\bar{D}}=0.58$ N=12	$\bar{\bar{D}}=0.00$ N=1	$\bar{\bar{D}}=0.00$ N=0	$\bar{\bar{D}}=0.64$ N=68

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QUESTIONNAIRE ITEM: 21

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}$ = 0.50 N = 4	$\bar{D}$ = 0.50 N = 2	$\bar{D}$ = 2.00 N = 1	--- N = 0	--- N = 0	$\bar{\bar{D}}$ = 0.71 N = 7
2	$\bar{D}$ = 0.67 N = 3	$\bar{D}$ = 0.06 N = 18	$\bar{D}$ = 1.00 N = 16	$\bar{D}$ = 2.00 N = 3	$\bar{D}$ = 1.00 N = 1	$\bar{\bar{D}}$ = 0.64 N = 41
3	$\bar{D}$ = 1.00 N = 1	$\bar{D}$ = 0.33 N = 3	$\bar{D}$ = 0.58 N = 12	$\bar{D}$ = 2.00 N = 3	--- N = 0	$\bar{\bar{D}}$ = 0.79 N = 19
4	--- N = 0	$\bar{D}$ = 1.00 N = 1	--- N = 0	--- N = 0	--- N = 0	$\bar{\bar{D}}$ = 1.00 N = 1
5	--- N = 0	--- N = 0	--- N = 0	--- N = 0	$\bar{D}$ = 3.00 N = 1	$\bar{\bar{D}}$ = 3.00 N = 1
	$\bar{\bar{D}}$ = 0.63 N = 8	$\bar{\bar{D}}$ = 0.17 N = 24	$\bar{\bar{D}}$ = 0.86 N = 29	$\bar{\bar{D}}$ = 2.00 N = 6	$\bar{\bar{D}}$ = 2.00 N = 2	$\bar{\bar{\bar{D}}}$ = 0.72 N = 69

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QUESTIONNAIRE ITEM: 25

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POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}=0.00$ N=1	--- N=0	$\bar{D}=2.00$ N=1	$\bar{D}=1.00$ N=3	$\bar{D}=0.25$ N=4	$\bar{\bar{D}}=.67$ N=9
2	--- N=0	--- N=0	$\bar{D}=0.80$ N=5	$\bar{D}=0.40$ N=5	$\bar{D}=0.33$ N=9	$\bar{\bar{D}}=.37$ N=19
3	--- N=0	--- N=0	$\bar{D}=1.50$ N=4	$\bar{D}=0.33$ N=6	$\bar{D}=0.86$ N=7	$\bar{\bar{D}}=.77$ N=17
4	--- N=0	$\bar{D}=1.00$ N=1	--- N=0	$\bar{D}=0.50$ N=2	$\bar{D}=0.57$ N=7	$\bar{\bar{D}}=.60$ N=10
5	--- N=0	$\bar{D}=1.00$ N=1	--- N=0	$\bar{D}=0.33$ N=3	$\bar{D}=0.33$ N=6	$\bar{\bar{D}}=.40$ N=10
	$\bar{D}=0.00$ N=1	$\bar{D}=1.00$ N=2	$\bar{D}=1.20$ N=10	$\bar{D}=.42$ N=19	$\bar{D}=.42$ N=33	$\bar{\bar{D}}=0.52$ N=65

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QUESTIONNAIRE ITEM: 27

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}=0.10$ N=21	$\bar{D}=0.50$ N=4	$\bar{D}=1.00$ N=1	$\bar{D}=1.00$ N=1	--- N=0	$\bar{\bar{D}}=0.28$ N=27
2	$\bar{D}=0.86$ N=22	$\bar{D}=0.13$ N=8	$\bar{D}=1.33$ N=3	$\bar{D}=1.00$ N=1	--- N=0	$\bar{\bar{D}}=0.7$ N=34
3	$\bar{D}=1.00$ N=1	--- N=0	$\bar{D}=0.67$ N=3	--- N=0	--- N=0	$\bar{\bar{D}}=0.75$ N=4
4	--- N=0	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{\bar{D}}=0.0$ N=0
5	--- N=0	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{\bar{D}}=0.0$ N=0
	$\bar{D}=0.50$ N=44	$\bar{D}=0.25$ N=12	$\bar{D}=1.00$ N=7	$\bar{D}=1.00$ N=2	$\bar{D}=0.00$ N=0	$\bar{\bar{D}}=0.53$ N=65

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QUESTIONNAIRE ITEM : 29

POSSIBLE I- SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}=0.00$ N=1	--- N=0	--- N=0	$\bar{D}=0.00$ N=1	$\bar{D}=0.06$ N=36	$\bar{\bar{D}}=0.15$ N=38
2	--- N=0	$\bar{D}=3.00$ N=1	$\bar{D}=1.00$ N=1	--- N=0	$\bar{D}=0.00$ N=20	$\bar{\bar{D}}=$ N=22
3	--- N=0	--- N=0	$\bar{D}=1.00$ N=1	--- N=0	$\bar{D}=0.29$ N=7	$\bar{\bar{D}}=0.3$ N=8
4	--- N=0	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{\bar{D}}=0.0$ N=0
5	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{D}=0.00$ N=1	$\bar{\bar{D}}=0.0$ N=1
	$\bar{\bar{D}}=0.00$ N=1	$\bar{\bar{D}}=3.00$ N=1	$\bar{\bar{D}}=1.00$ N=2	$\bar{\bar{D}}=0.00$ N=1	$\bar{\bar{D}}=0.07$ N=64	$\bar{\bar{\bar{D}}}=0.15$ N=69

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QUESTIONNAIRE ITEM: 30

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}=0.21$ N=24	$\bar{D}=0.50$ N=8	$\bar{D}=2.00$ N=1	--- N=0	$\bar{D}=0.00$ N=1	$\bar{\bar{D}}=0.31$ N=39
2	$\bar{D}=0.69$ N=13	$\bar{D}=0.50$ N=8	$\bar{D}=1.00$ N=1	--- N=0	--- N=0	$\bar{\bar{D}}=0.64$ N=22
3	$\bar{D}=1.50$ N=4	$\bar{D}=1.00$ N=1	$\bar{D}=0.00$ N=1	--- N=0	--- N=0	$\bar{\bar{D}}=1.17$ N=6
4	$\bar{D}=2.00$ N=1	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{\bar{D}}=2.00$ N=1
5	--- N=0	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{\bar{D}}=0.00$ N=0
	$\bar{D}=0.49$ N=47	$\bar{D}=0.53$ N=17	$\bar{D}=1.00$ N=3	$\bar{D}=0.00$ N=0	$\bar{D}=0.00$ N=0	$\bar{\bar{D}}=0.51$ N=68

Appendix S

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QUESTIONNAIRE ITEM: 8

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POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}=0.25$ N=20	$\bar{D}=0.43$ N=7	- - - N=0	- - - N=0	- - - N=0	$\bar{D}=0.3$ N=27
2	$\bar{D}=0.83$ N=41	$\bar{D}=0.29$ N=17	$\bar{D}=1.00$ N=5	- - - N=0	- - - N=0	$\bar{D}=0.7$ N=63
3	$\bar{D}=1.56$ N=9	$\bar{D}=0.75$ N=12	$\bar{D}=0.00$ N=2	$\bar{D}=1.00$ N=1	- - - N=0	$\bar{D}=1.01$ N=24
4	$\bar{D}=2.00$ N=3	$\bar{D}=1.00$ N=2	- - - N=0	$\bar{D}=1.00$ N=1	- - - N=0	$\bar{D}=1.50$ N=6
5	$\bar{D}=3.00$ N=1	- - - N=0	- - - N=0	- - - N=0	- - - N=0	$\bar{D}=3.00$ N=1
	$\bar{D}=0.83$ N=74	$\bar{D}=0.47$ N=38	$\bar{D}=0.71$ N=7	$\bar{D}=1.00$ N=2	$\bar{D}=0.00$ N=0	$\bar{\bar{D}}=0.73$ N=121

STUDY CODE : OE III

QUESTIONNAIRE ITEM: 12

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POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	--- N=0	--- N=0	$\bar{D}$=1.00 N=1	$\bar{D}$=3.00 N=1	$\bar{D}$=0.18 N=11	$\bar{\bar{D}}$=0.46 N=13
2	--- N=0	$\bar{D}$=2.00 N=1	$\bar{D}$=1.17 N=6	$\bar{D}$=0.50 N=4	$\bar{D}$=0.61 N=13	$\bar{\bar{D}}$=0.78 N=24
3	--- N=0	$\bar{D}$=2.00 N=1	$\bar{D}$=1.00 N=5	$\bar{D}$=0.33 N=12	$\bar{D}$=0.60 N=10	$\bar{\bar{D}}$=0.60 N=28
4	--- N=0	$\bar{D}$=2.00 N=1	$\bar{D}$=0.00 N=1	$\bar{D}$=0.71 N=7	$\bar{D}$=0.90 N=10	$\bar{\bar{D}}$=0.84 N=19
5	--- N=0	--- N=0	--- N=0	$\bar{D}$=0.80 N=5	$\bar{D}$=0.04 N=26	$\bar{\bar{D}}$=0.16 N=31
	$\bar{D}$=0.00 N=0	$\bar{D}$=2.00 N=3	$\bar{D}$=1.00 N=13	$\bar{D}$=0.61 N=29	$\bar{D}$=0.37 N=70	$\bar{\bar{D}}$=0.53 N=115

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QUESTIONNAIRE ITEM : 14

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POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}$=0.19 N=21	$\bar{D}$=0.73 N=15	$\bar{D}$=1.50 N=2	--- N=0	--- N=0	$\bar{D}$=0.47 N=38
2	$\bar{D}$=0.38 N=16	$\bar{D}$=0.22 N=36	$\bar{D}$=0.58 N=12	--- N=0	--- N=0	$\bar{D}$=0.33 N=64
3	$\bar{D}$=1.00 N=3	$\bar{D}$=0.33 N=6	$\bar{D}$=0.50 N=2	$\bar{D}$=1.00 N=2	--- N=0	$\bar{D}$=0.61 N=13
4	$\bar{D}$=3.00 N=1	$\bar{D}$=1.50 N=2	--- N=0	--- N=0	--- N=0	$\bar{D}$=2.00 N=3
5	--- N=0	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{D}$=0.0 N=0
	$\bar{D}$=0.39 N=41	$\bar{D}$=0.40 N=59	$\bar{D}$=0.68 N=16	$\bar{D}$=1.00 N=2	$\bar{D}$=0.00 N=0	$\bar{D}$=0.45 N=118

STUDY CODE: OE III

QUESTIONNAIRE ITEM: 15

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POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}=0.24$ N=21	$\bar{D}=0.75$ N=8	$\bar{D}=1.00$ N=1	--- N=0	--- N=0	$\bar{D}=0.40$ N=30
2	$\bar{D}=0.71$ N=21	$\bar{D}=0.36$ N=25	$\bar{D}=0.90$ N=10	$\bar{D}=1.00$ N=1	--- N=0	$\bar{D}=0.59$ N=57
3	$\bar{D}=1.14$ N=7	$\bar{D}=0.60$ N=5	$\bar{D}=0.83$ N=6	$\bar{D}=0.00$ N=1	--- N=0	$\bar{D}=0.84$ N=19
4	$\bar{D}=2.33$ N=3	$\bar{D}=1.00$ N=5	$\bar{D}=0.50$ N=4	$\bar{D}=0.50$ N=2	--- N=0	$\bar{D}=1.07$ N=14
5	$\bar{D}=4.00$ N=1	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{D}=4.0$ N=1
	$\bar{D}=0.73$ N=53	$\bar{D}=0.53$ N=43	$\bar{D}=0.80$ N=21	$\bar{D}=0.50$ N=4	$\bar{D}=0.00$ N=0	$\bar{D}=0.67$ N=121

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QUESTIONNAIRE ITEM: 19

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}=0.30$ N=30	$\bar{D}=0.50$ N=12	--- N=0	--- N=0	--- N=0	$\bar{D}=0.3$ N=42
2	$\bar{D}=1.14$ N=29	$\bar{D}=0.26$ N=23	$\bar{D}=0.54$ N=11	--- N=0	--- N=0	$\bar{D}=0.7$ N=63
3	$\bar{D}=1.60$ N=5	$\bar{D}=0.60$ N=5	$\bar{D}=.67$ N=3	--- N=0	--- N=0	$\bar{D}=1.0$ N=13
4	$\bar{D}=2.00$ N=1	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{D}=2.0$ N=1
5	$\bar{D}=4.00$ N=1	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{D}=4.0$ N=1
	$\bar{D}=0.84$ N=66	$\bar{D}=0.36$ N=40	$\bar{D}=0.56$ N=14	$\bar{D}=0.00$ N=0	$\bar{D}=0.00$ N=0	$\bar{D}=0.6$ N=120

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QUESTIONNAIRE ITEM: 21

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}=0.00$ N=1	$\bar{D}=1.00$ N=1	- - - N=0	$\bar{D}=2.00$ N=1	$\bar{D}=0.00$ N=1	$\bar{\bar{D}}=0.75$ N=4
2	$\bar{D}=0.80$ N=5	$\bar{D}=0.27$ N=15	$\bar{D}=0.86$ N=29	$\bar{D}=1.25$ N=8	$\bar{D}=3.00$ N=4	$\bar{\bar{D}}=0.90$ N=61
3	$\bar{D}=1.00$ N=5	$\bar{D}=0.67$ N=6	$\bar{D}=0.52$ N=23	$\bar{D}=1.20$ N=5	$\bar{D}=1.50$ N=2	$\bar{\bar{D}}=0.78$ N=41
4	- - - N=0	- - - N=0	$\bar{D}=0.67$ N=6	$\bar{D}=1.00$ N=1	- - - N=0	$\bar{\bar{D}}=0.72$ N=7
5	$\bar{D}=4.00$ N=1	- - - N=0	$\bar{D}=0.00$ N=1	$\bar{D}=1.00$ N=1	$\bar{D}=0.00$ N=1	$\bar{\bar{D}}=1.25$ N=4
	$\bar{\bar{D}}=1.08$ N=12	$\bar{\bar{D}}=0.41$ N=22	$\bar{\bar{D}}=0.69$ N=59	$\bar{\bar{D}}=1.25$ N=16	$\bar{\bar{D}}=1.88$ N=8	$\bar{\bar{\bar{D}}}=0.84$ N=117

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QUESTIONNAIRE ITEM: 25

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	- - - N=0	$\bar{D}$=2.00 N=1	$\bar{D}$=1.50 N=6	$\bar{D}$=1.10 N=10	$\bar{D}$=0.52 N=27	$\bar{\bar{D}}$=0.80 N=44
2	- - - N=0	$\bar{D}$=1.50 N=2	$\bar{D}$=1.00 N=7	$\bar{D}$=0.67 N=9	$\bar{D}$=0.19 N=16	$\bar{\bar{D}}$=0.50 N=34
3	- - - N=0	$\bar{D}$=0.00 N=1	$\bar{D}$=1.00 N=3	$\bar{D}$=0.50 N=2	$\bar{D}$=0.22 N=9	$\bar{\bar{D}}$=0.39 N=15
4	- - - N=0	$\bar{D}$=2.00 N=1	- - - N=0	$\bar{D}$=0.67 N=3	$\bar{D}$=0.60 N=5	$\bar{\bar{D}}$=0.71 N=9
5	- - - N=0	- - - N=0	$\bar{D}$=1.00 N=2	$\bar{D}$=1.00 N=1	$\bar{D}$=0.64 N=11	$\bar{\bar{D}}$=0.71 N=14
	$\bar{D}$=0.00 N=0	$\bar{D}$=1.40 N=5	$\bar{\bar{D}}$=1.16 N=18	$\bar{D}$=0.84 N=25	$\bar{D}$=0.42 N=68	$\bar{\bar{D}}$=0.67 N=116

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QUESTIONNAIRE ITEM : 27

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}=0.26$ N=49	$\bar{D}=0.88$ N=8	--- N=0	--- N=0	--- N=0	$\bar{\bar{D}}=0.34$ N=57
2	$\bar{D}=0.81$ N=42	$\bar{D}=0.40$ N=10	--- N=0	--- N=0	--- N=0	$\bar{\bar{D}}=0.73$ N=52
3	$\bar{D}=1.33$ N=6	$\bar{D}=0.67$ N=3	--- N=0	--- N=0	--- N=0	$\bar{\bar{D}}=1.11$ N=9
4	$\bar{D}=1.00$ N=1	$\bar{D}=0.50$ N=2	--- N=0	--- N=0	--- N=0	$\bar{\bar{D}}=0.6$ N=3
5	--- N=0	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{\bar{D}}=0.0$ N=0
	$\bar{D}=0.56$ N=98	$\bar{D}=0.61$ N=23	$\bar{D}=0.00$ N=0	$\bar{D}=0.00$ N=0	$\bar{D}=0.00$ N=0	$\bar{\bar{D}}=0.57$ N=121

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QUESTIONNAIRE ITEM: 29

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}$ = - - - N=0	$\bar{D}$ = - - - N=0	$\bar{D}$=1.00 N=1	$\bar{D}$=1.00 N=3	$\bar{D}$=0.00 N=46	$\bar{\bar{D}}$=0.80 N=50
2	$\bar{D}$=4.00 N=1	$\bar{D}$ = - - - N=0	$\bar{D}$=2.00 N=1	$\bar{D}$=0.50 N=2	$\bar{D}$=0.42 N=53	$\bar{\bar{D}}$=0.51 N=57
3	$\bar{D}$ = - - - N=0	$\bar{D}$ = - - - N=0	$\bar{D}$ = - - - N=0	$\bar{D}$ = - - - N=0	$\bar{D}$=0.86 N=7	$\bar{\bar{D}}$=0.86 N=7
4	$\bar{D}$ = - - - N=0	$\bar{D}$ = - - - N=0	$\bar{D}$ = - - - N=0	$\bar{D}$ = - - - N=0	$\bar{D}$=1.50 N=6	$\bar{\bar{D}}$=1.50 N=6
5	$\bar{D}$ = - - - N=0	$\bar{D}$ = - - - N=0	$\bar{D}$ = - - - N=0	$\bar{D}$ = - - - N=0	$\bar{D}$ = - - - N=0	$\bar{\bar{D}}$=0.00 N=0
	$\bar{\bar{D}}$=4.00 N=1	$\bar{\bar{D}}$=0.00 N=0	$\bar{\bar{D}}$=1.50 N=2	$\bar{\bar{D}}$=0.80 N=5	$\bar{\bar{D}}$=0.33 N=112	$\bar{\bar{\bar{D}}}$=0.40 N=120

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QUESTIONNAIRE ITEM : 30

POSSIBLE I-SCORES

POSSIBLE E-SCORES	1	2	3	4	5	
1	$\bar{D}=0.31$ N=52	$\bar{D}=0.46$ N=13	$\bar{D}=1.00$ N=1	--- N=0	--- N=0	$\bar{D}=0.24$ N=66
2	$\bar{D}=0.72$ N=32	$\bar{D}=0.58$ N=12	$\bar{D}=1.00$ N=1	--- N=0	--- N=0	$\bar{D}=0.68$ N=45
3	$\bar{D}=1.00$ N=4	$\bar{D}=1.00$ N=1	--- N=0	--- N=0	--- N=0	$\bar{D}=1.00$ N=5
4	$\bar{D}=2.00$ N=2	--- N=0	$\bar{D}=1.00$ N=4	--- N=0	--- N=0	$\bar{D}=1.33$ N=6
5	$\bar{D}=2.00$ N=1	--- N=0	--- N=0	--- N=0	--- N=0	$\bar{D}=2.00$ N=1
	$\bar{D}=0.54$ N=91	$\bar{D}=0.53$ N=26	$\bar{D}=1.00$ N=6	$\bar{D}=0.00$ N=0	$\bar{D}=0.00$ N=0	$\bar{D}=0.5$ N=123

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Aggregate summaries in OEIII

mean E-score over 10 behaviors vs. E_T-score	r = +.58
mean D-score over 10 behaviors vs. E_T-score	r = +.56
S*E vs. E_T-score	r = +.55
S*D vs. E_T-score	r = +.57